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AUDITING SERVICES IN EVALUATION OF COMPANIES' INFORMATION SYSTEMS AND TECHNOLOGIES EFFICIENCY

The article deals with the methodological basis for providing auditing services on evaluation of efficiency of information systems and technologies for the purpose of their application in practical activity of audit companies and internal control (audit) units aimed at satisfaction of information needs of companies and functional enhancement of their information resources. The basic criteria, data ware, subject and object of audit necessary for drawing up an audit report and assurance declaring are established. The program and the detailed list of auditing procedures for efficiency evaluation of information systems and technologies are presented.

Keywords: auditing services; information systems and technologies; efficiency.

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АУДИТОРСЬКІ ПОСЛУГИ В ОЦІНЮВАННІ ЕФЕКТИВНОСТІ ІНФОРМАЦІЙНИХ СИСТЕМ І ТЕХНОЛОГІЙ КОМПАНІЙ

У статті запропоновано методичні засади надання аудиторських послуг з оцінювання ефективності інформаційних систем і технологій для застосування в практичній діяльності аудиторських фірм та служб внутрішнього контролю (аудиту) компаній з метою задоволення зростаючих інформаційних потреб компаній та функціональної активізації їх інформаційних ресурсів. Встановлено основні критерії, інформаційне забезпечення, предмет та об'єкти аудиторської перевірки, необхідні для формування аудиторського висновку й висловлення впевненості щодо достовірної інформації. Запропоновано програму й детальний перелік аудиторських процедур щодо оцінювання ефективності інформаційних систем та технологій.

Ключові слова: аудиторські послуги; інформаційні системи і технології; ефективність.

Рис. 1. Табл. 1. Літ. 14.

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АУДИТОРСКИЕ УСЛУГИ В ОЦЕНКЕ ЭФФЕКТИВНОСТИ ИНФОРМАЦИОННЫХ СИСТЕМ И ТЕХНОЛОГИЙ КОМПАНИЙ

В статье предложены методические основы оказания аудиторских услуг по оценке эффективности информационных систем и технологий для применения в практической деятельности аудиторских фирм и служб внутреннего контроля (внутреннего аудита) компаний с целью удовлетворения растущих информационных потребностей компаний и функциональной активизации их информационных ресурсов. Определены основные критерии, информационное обеспечение, предмет и объекты аудиторской проверки, необходимые для формирования аудиторского заключения и высказывания уверенности в достоверности информации. Предложена программа и детальней перечень аудиторских процедур по оценке эффективности информационных систем и технологий.

Ключевые слова: аудиторские услуги; информационные системы и технологии; эффективность.

Problem setting. Economic globalization and intensification of competitive struggle have put forward the demands for higher efficiency in companies' activity. Information technologies (IT) have become the key resource, the root of new opportunities and competitive advantages for escalating the needs of economic units.

Application and introduction of up-to-date IT have to reflect corporate principles, ideas, goals, companies' traditions and contribute to implementation of planned

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strategies, thus leading to the improvement of management efficiency and higher enterprise value.

However, stereotyped thinking of CEOs and negligent work of staff in using IT cause a range of risks and disadvantages in corporate management. For example, for the last 10 years there was an impressive number of unsuccessful large IT investments (Weill and Ross, 2004; Spivakovskiy et al., 2014), particularly:

- initiatives, connected with the implementation of ERP-systems (Enterprise Resource Planning), which remained unfinished;
- initiatives in the field of e-business, poorly designed or poorly implemented;
- experiments on databases automation, which resulted in receiving a lot of new data, but only a small part of them appeared to be actually valuable.

According to certain estimations (Weill and Ross, 2004), the share of failures is more than 70% of all IT projects. While some unsuccessful investments in IT are the result of technical problems, most of them indicate the inability of companies and their managers to develop and manage new processes that would allow applying new technologies effectively.

Due to this, commercial and even nonprofit organizations are trying to apply such mechanisms of organization, integration and control, which will provide the coordination in the work of information and other resources. One of these mechanisms is represented by auditing services on evaluation of efficiency of information technologies, provided by audit organizations upon request and initiative of companies.

Latest research and publication analysis. In contemporary economic literature one can find a number of scientific works dealing with the urgent problems of interconnection of audit, control, revision and their influence on the system of companies' management: A. Arens et al. (2005), F.F. Butynets (2002), T.A. Kalinska and Y.B. Samchynska (2011), V.F. Maksimova and Y.B. Fedorova (2009). Hence, audit has ample opportunities for functional activation of the key resources in the system of corporate management, which demand further study.

The problems of efficiency of information technologies' application and management are dealt in the works of M. Broadbent and E. Kitzis (2005), O.V. Spivakovskiy et al. (2014), P. Weill and J. Ross (2004), P. Weill and R. Woodham (2002) and others.

A number of advantages of IT in corporate management can be found in the strategies of COBIT – Governance Control and Assurance for Information and Related Technology, developed by the IT Governance Institute (2013). The components of COBIT provide integrated methods for attaining organization's goals based on risk management and the events of information control (Information Systems Audit and Control Association, Inc., 2013). Yet, such a powerful instrument of IT tasks' management requires significant investments and well-trained skilled human resources, which is not always within the power of a number of companies.

Unresolved issues. At the international market of audit services a trend of organizing audit companies, which specialize in sectoral areas, is growing (Arens et al., 2005). For example, transnational consulting and audit corporation "PricewaterhouseCoopers" has merged these sectoral areas into the following three clusters:

- consumer and industrial products and services;
- financial services;
- information and communication technologies and entertainment industry.

Audit of IT is in great demand from customers and is included into the third cluster of audit and consulting services. Activity arrangement according to the most profitable sectoral areas helps such powerful company as "PricewaterhouseCoopers" know and understand the business of its customers better and provide additional services to them.

In Ukraine audit is a very "young" type of audit activity having a small market yet. However, rapid growth of this industry (growth of quantity of auditory companies as well as growing information demands of audit users, who use the newest informational technologies more and more), require theoretical and organizational research of audit services to evaluate the effectiveness of information systems and technologies.

In particular, there is no integrated methodology for conducting an audit of using IT. There are no specified objects that are subject to audit as well as no indicators or criteria, to be used while evaluating. Scientists have not cleared up the stages of estimation of IT efficiency as well as the necessary audit procedures. Therefore, an optimal choice of methodical support of audit services suitable for efficiency (compliance) estimation of informational systems and technologies is still an issue.

The purpose of this article is to develop theoretical, organizational and methodological support for auditing services for evaluation of companies' information systems and technologies efficiency.

Key research findings. Information technologies as the complex of processes and resources provide companies with information needed to administrate business processes, focusing on major business goals. In addition to that, efficient IT management is necessary for enterprises, as its results lie in encouraging employees' skills for rational and best possible application of IT, as well as in providing correspondence of their behavior in terms of IT to corporate long-term vision and values (Weill and Ross, 2004).

The question arises: how is it possible to evaluate the correspondence of information systems, which are being used with the primary activity of companies? how is it possible to determine the efficiency of information technologies management? Efficient IT management has to be addressed to the solution of the three main issues:

1) Which decisions should be made for providing efficient IT management and application?

2) Who has to make such decisions?

3) In what way will these decisions be implemented and how will the control over their execution be held? (Spivakovskiy et al., 2014).

Ample opportunities for the best possible solution of the third issue are provided by application of auditing services as a method of efficiency evaluation and control over the use of information systems (technologies) in offices.

According to International Standards on Auditing, Assurance and Ethics (2007), which were adopted by the decision of the Audit Chamber of Ukraine as national for domestic auditing activities, the tasks, which are being performed by an auditor, comprise various services, which may fall within the scope of assurance engagements by International Auditing and Assurance Standards Board.

According to the conceptual framework of assurance engagements, engagements are such activities which, in case of being performed by an auditor, lead to an auditor's conclusion aimed at increase in confidence of future users, who are not a responsible party, in the results of evaluation or comparison between the subject of engagement and relevant criteria.

Assurance service is an independent professional service, typically provided by Certified Public Accountants (auditors), with the goal of improving information or the context of information so that decision makers can make more informed, and presumably better, decisions (Samchynska, 2012). Assurance services provide independent and professional opinions that reduce information risks.

According to the International Standards on Auditing, auditing services for evaluation (examination) of information systems (technologies) efficiency are classified among assurance engagements other than audits or reviews of historical financial information, and are included into the list of services which can be provided by auditors (audit firms); the list was adopted by the decision of the Audit Chamber of Ukraine #182/5 as of 27 September 2007.

More specific definition of auditing services for evaluation of companies' information technologies efficiency is given in Figure 1.

The main task of auditing services for control of information systems (information communication technologies) efficiency is to evaluate independently and objectively if information technologies provide necessary services.

As a result of auditing procedures, a report containing the conclusion about assurance regarding the matter of the examination is issued. The objects of audit in this particular case are companies' financial and non-financial information regarding the principles of IT governance, IT architecture, IT infrastructure and services, software needs and investments into IT. We shall consider in more detail the essence of these objects of audit.

IT principles are defined as a set of interrelated regulations of IT application in a given business, established by top management. Due to it, it is important for an auditor to get familiar with them and provide their evaluation.

IT architecture: enterprises need a logic of organizing data, software applications and infrastructure as integration and standardization determine the opportunities and the range of influence of ITs. Processes integration provides many business units with the possibility to represent a company's integrated image for their clients, or to transfer from one function to another.

IT infrastructure is the basis for implementation of technical and human opportunities of information resources, which are planned by companies; they perform as reliable services used cooperatively in many software applications. Effective IT infrastructure leads to quick implementation of future business-initiatives realized with the help of electronic devices, as well as to consolidation and slowdown in operating activity expenditure.

Excessive investing in infrastructural development or using inappropriate information technologies infrastructure leads to misapplication of company's resources, failure to meet deadlines and system incompatibility between business partners. Meanwhile, insufficient funding of infrastructure causes failure to meet target dates, existence of "islands" of automation, which satisfy the demands for separate local

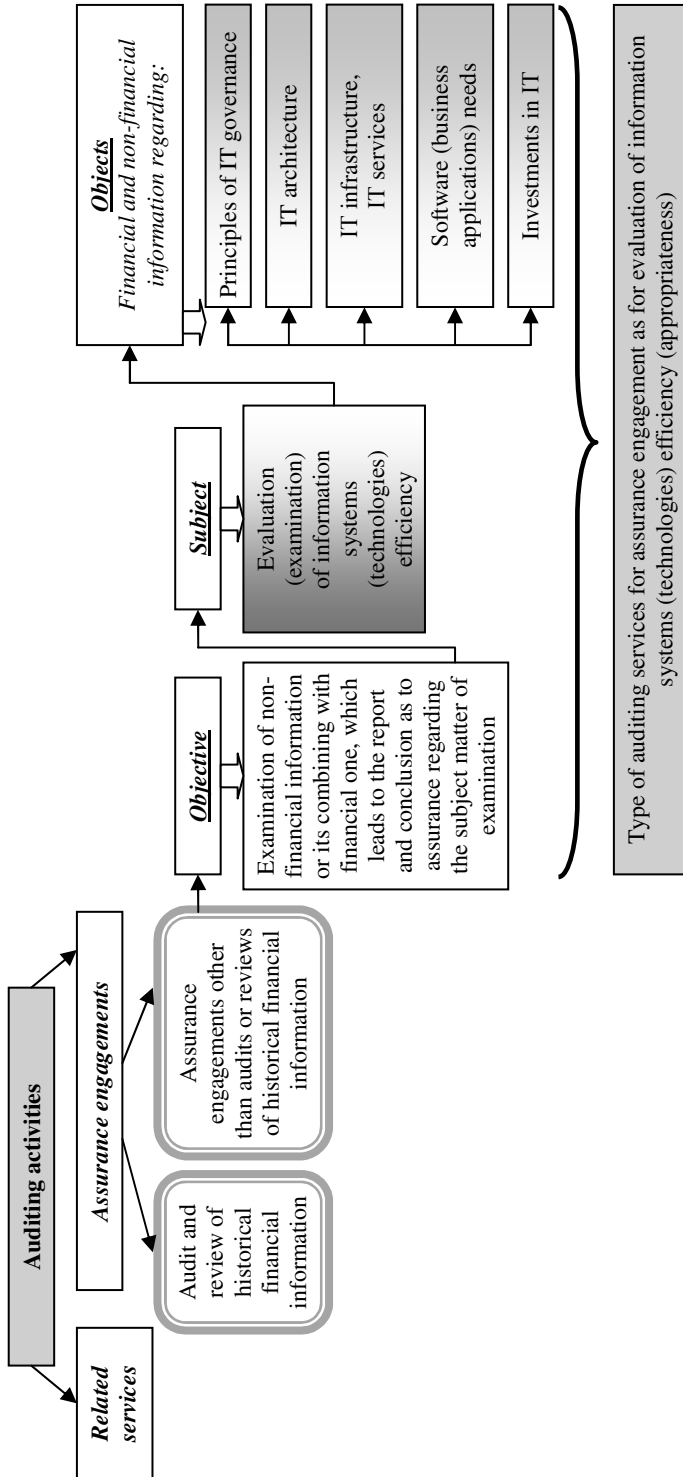


Figure 1. Formation of the subject-matter of "auditing services for assurance in evaluation of information systems (technologies) efficiency", authors' construction

needs without integration at company level, and also restrict the joint use of resources, information and expert knowledge.

IT services, the functioning of which is examined by an auditor, include:

- information communication network services;
- providing and management of high-level computing hardware (such as servers and mainframes);
- shared client database management;
- study and expert knowledge development aimed at exposure of advantages of new technologies for business;
- creation of a local corporate network (intranet).

These services may be provided by internal departments of an enterprise or through external sources.

Software needs lie in identification of a company's needs for purchasing or in-house development of software applications.

Investments in IT – studying this object an auditor focuses on the examination of IT investment portfolio (in what way resources allocated and what share) and on bringing IT investments into compliance with strategic priorities of a company (in what way different demands are coordinated).

The abovementioned 5 objects of audit cannot be considered separately. Only a complex approach to these objects of audit will enable a reasoned conclusion as for assurance and clients' information needs satisfaction as for the use of IT. To fulfill this task, each of the 5 objects should be placed under evaluation by the following criteria:

- compliance of IT with strategic development (preferable behavior);
- the level of organization and IT;
- the problem of value due to the use of IT;
- result achievement (satisfaction level) from the use of IT.

Table 1 proposes the detailed list of auditing procedures for evaluation of information systems (technologies) efficiency, which comply with the abovementioned approach.

We shall propose the program of auditing services for the evaluation of IT efficiency.

Stage 1. Constituting a contract of audit. First of all, an audit firm and a client coordinate a plan and a program of auditing; volume, time and costs of auditing are determined.

Stage 2. Examination of planning and organization. For this purpose, an auditor gets familiar with the following characteristic of IT processes:

- information on the aims and growth directions of a company, existence of a strategic plan of IT development;
- organizational structure of a company, interrelations between information and other key resources;
- IT architecture;
- IT investment management;
- IT personnel management;
- the influence of IT on quality management process;
- IT risks management.

Table 1. List of auditing procedures for evaluation of information systems (technologies) efficiency, made by the authors

Objects of audit	Auditing procedures
Principles of IT governance	Identification of the operational model of a company.
	Determination of the role and place of IT in business operations.
	Establishing the principles of preferable behavior towards IT.
	Establishing the principles and demands for IT financing.
IT architecture	Determination of the information that establishes the basis for key business processes of a company. In what way is data integration performed?
	Identification of technical opportunities for data standardization at company level aimed at supporting the efficient use of IT, facilitation of standardization and integration of business processes.
	Identification of types of activities, which require standardization at all levels supporting data integration.
IT infrastructure and IT services	Identification of IT resources both available and needed.
	Estimation of available IT services to provide operational activity and achievement of strategic aims of a company.
	Estimation of IT services, determination of quality of information infrastructure support from the viewpoint of its reliability, safety, steadiness and time-liness.
	Analysis of IT services from the viewpoint of providing integrality, accessibility, confidentiality, and reliability of information.
	Existence of a plan for the up-to-date support of main technologies.
Software needs (business applications)	Are there any infrastructural services performed by outsourcers?
	Estimation of needs and possibilities for realization of new software applications (from the viewpoint of market and company's business processes. Is their success rate being researched (experimentally researched)?
	Determining the level of needs satisfaction for business departments of a company in terms of architecture standards.
Investments in IT	Who determines necessary organizational changes of software applications for increase in business value?
	Establishing strategically important ways of improving company's processes; do IT investments comply with strategic views and principles of a company, do IT investments encourage achievement of strategic aims?
	Determining demands and expectations of an enterprise from the resources invested in IT.
	Determining the correlation between the received results from the implementation of ITs and the results a company expects to get after investments.
	Estimation of current and submitted IT investment portfolios. Are these portfolios in accordance with a company's strategic aims?
	Contrastive analysis of IT investments relevance of a whole enterprise and investments of separate business units.
	Estimation of appropriate profit from IT investments at an acceptable level of a company's expenses and risks.
	Determining the correlation between IT investments and a company's processes organization.
	Do IT investments encourage the development of a company's organization?
	Do IT investments comply with other planned tasks and initiatives?
	Establishing responsibilities of personnel for the results obtained from investments.
	Existence of measures for evaluation of investment results.
	Existence of sufficient technical and administrative resources for achieving necessary productivity.

Stage 3. Evaluation of the system of monitoring and internal control. Auditors examine the efficiency of the system of internal control and monitoring, determine the compliance of IT using with regulatory demands of a company, and evaluate the level of supplying corporate management with information technologies.

Stage 4. Examining IT purchase and introduction. The following processes within a firm are evaluated:

- taking decisions on automation;
- purchase and introduction of software;
- purchase and support of technological infrastructure;
- performing operational activities, connected with IT;
- information resources supply.

Stage 5. Evaluation of IT operation and support. Auditors perform the auditing procedures concerning evaluation and analysis of the following IT processes:

- determining and management of the level of service support and operation of information systems; technical support management;
- performing the task of IT services steadiness;
- information systems and data security arrangements;
- configuration control;
- problem management;
- data management;
- determination and allocation of expenses;
- training of information systems users.

In the course of analysis, the scope and quality of available resources are examined in more detail.

Stage 6. Compilation of auditing report and conclusion. The final stage of auditing is characterized by the revision of received materials, audit evidences and auditor's working papers aimed at preparing a report on efficiency assurance and appropriateness of information systems (technologies).

The abovementioned programs of audit focus on the evaluation and analysis of information systems and technologies from the viewpoint of their cost for a whole company's business on condition that expenses are rational and risks are reasonable.

Therefore, the subject-matter of audit for assurance engagement on evaluation (control) of efficiency (appropriateness) of information systems and technologies is financial and non-financial information, which forms the system of corporate management of a company in terms of information technologies management and relevant strategic thinking, financial planning.

On the one hand, the abovementioned auditing services as a specific method of control are the means of functional activation of information resources in an enterprise, since the result of their performance is a report and conclusion on the efficiency of available IT services, and, therefore, objective exposure of lost opportunities of IT, unused resources. After agreeing with a customer, auditing companies may take part in the development of recommendations and their unused resources.

On the other hand, in the context of a more complete disclosure of the potential of audit, this type of auditing services gives a possibility not only to objectively evaluate a real situation in a company, the resource base of its strategic plans and IT projects, but also to provide their controllability and manageability.

Conclusions. Customers of auditing services, reviewed in this article, are companies, which want to get an expert analysis on the usage state of information systems and technologies and to evaluate their efficiency in the course of the main strategy realization, as well as companies, which try to escape the loss of competitive advantages and to reveal lost possibilities of information systems use.

The means of satisfying companies' information needs for evaluation of information systems efficiency (information communication technologies) include auditing services aimed at evaluation and analysis of the following objects: principles of IT management, IT architecture, information infrastructure and IT services, needs for software applications and investments in IT. Auditing procedures in regard to these objects are best to be performed by such major criteria as compliance of IT with strategic development (preferable behavior); influence if IT at the level of organizing business processes; value due to the use of IT; evaluation of results (satisfaction level) from the use of IT.

The proposed methodical principles of audit for the evaluation of IT efficiency may be useful for application in practical activities of audit firms and internal control (audit) units of companies and enterprises.

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Стаття надійшла до редакції 1.04.2015.